

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-28 (Cancelled)

29. (New) A composite structure comprising at least:

a structural layer C1;

a weight-reducing layer C2 of rigid or semi rigid foam; and

optionally a structural layer C3

wherein the foam is a polyamide-class foam.

30. (New) The composite structure as claimed in claim 29, being a sandwich structure comprising two outer structural layers C1 and C3, and a weight-reducing internal layer C2.

31. (New) The composite structure as claimed in claim 30, wherein at least one structural layer is a plate or a sheet.

32. (New) The composite structure as claimed in claim 31, wherein the plate or sheet of metal is of a metal alloy, optionally steel.

33. (New) The composite structure as claimed in claim 29, wherein the structural layer has a thickness of between 0.2 and 3 mm.

34. (New) The composite structure as claimed in claim 29, wherein the composite layer has a thickness of between 3 and 50 mm.

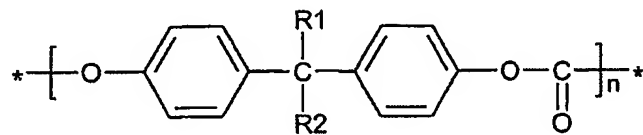
35. (New) The composite structure as claimed in claim 29, having a density of the foam of less than 300 kg/m^3 , and optionally between 30 and 200 kg/m^3 .

36. (New) The composite structure as claimed in claim 29, wherein the foam has a Young's modulus (modulus of elasticity in compression) greater than or equal to 30 MPa.

37. (New) The composite structure as claimed in claim 29, wherein the polyamide foam is obtained by injecting gas into the polyamide and/or by incorporating volatile compounds, blowing agents and/or a compound reacting with the polyamide to form gas, in the polyamide.

38. (New) The composite structure as claimed in claim 37, wherein the foam is obtained from a mixture of polyamide and polycarbonate.

39. (New) The composite structure as claimed in claim 38, wherein the polycarbonate is a polycarbonate comprising aromatic rings of formula:



in which R₁ and R₂, which are identical or different, are hydrogen atoms, halogen atoms or alkyl or haloalkyl radicals having between 1 and 5 carbon atoms, and each aromatic ring optionally being substituted by alkyl or haloalkyl radicals having between 1 and 5 carbon atoms; and n is an integer between 40 and 300.

40. (New) The composite structure as claimed in claim 39, wherein the polycarbonate has a molecular weight of between 5000 and 80000.

41. (New) The composite structure as claimed in claim 38, wherein the mixture contains 0.5 to 20 wt.% of polycarbonate relative to the polyamide, optionally 5 to 15 wt.%.

42. (New) The composite structure as claimed in claim 38, wherein the foam is obtained by heating the mixture of polyamide and polycarbonate at a temperature greater than or equal to the melting point of the polyamide.

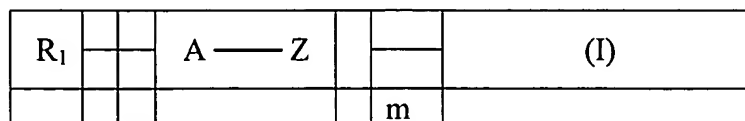
43. (New) The composite structure as claimed in claim 29, wherein at least one structural layer is a plate or a sheet comprising a thermoplastic or thermosetting polymer matrix.

44. (New) The composite structure as claimed in claim 43, wherein at least one structural layer is a plate or a sheet comprising a thermoplastic or thermosetting polymer matrix and reinforcing fibers, optionally glass, carbon, aramid, polyimide, quartz, sisal, hemp, or flax fibers.

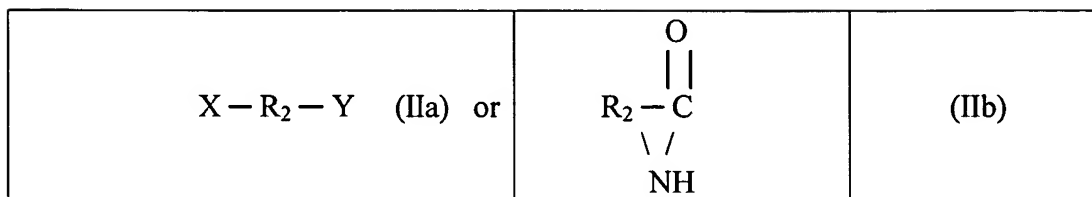
45. (New) The composite structure as claimed in claim 43, wherein the matrix comprises a star-structured polyamide comprising:
star-structured macromolecular chains comprising one or more cores and at least three arms or three polyamide segments connected to the core, and
optionally, linear macromolecular polyamide chains.

46. (New) The composite structure as claimed in claim 45, wherein the star-structured polyamide is of the type of polyamides obtained by copolymerization of a mixture of monomers comprising at least:

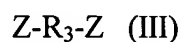
a) monomers of the following general formula (I):



b) monomers of the following general formulas (IIa) and (IIb):



c) and optionally monomers of the following general formula (III):



wherein:

R_1 is a hydrocarbon radical having at least 2 carbon atoms, linear or cyclic, aromatic or aliphatic optionally containing heteroatoms,

A is a covalent bond or an aliphatic hydrocarbon radical optionally containing heteroatoms and has from 1 to 20 carbon atoms,

Z represents a primary amine function or a carboxylic acid function,

Y is a primary amine function when X represents a carboxylic acid function

or

Y is a carboxylic acid function when X represents a primary amine function,

R_2 and R_3 , which are identical or different, represent optionally substituted aliphatic, cycloaliphatic or aromatic hydrocarbon radicals having from 2 to 20 carbon atoms optionally containing heteroatoms, and

m represents an integer between 3 and 8.

47. A method of production of the composite structure as defined in claim 29, comprising the step of assembly of at least the following elements:

(C1'): a structural layer or a precursor of said layer;

(C2'): a weight-reducing layer of polyamide-based foam or a precursor of said foam; and

optionally (C3'): a structural layer or a precursor of said layer.

48. (New) The method as claimed in claim 47, wherein the precursor of the foam is a powder or an article comprising an expandable polyamide composition containing polyamide and an expanding agent.

49. (New) The method as claimed in claim 48, wherein the expanding agent is a polycarbonate.

50. (New) The method as claimed in claim 47, wherein the precursor of at least one structural layer is an article containing reinforcing fibers.

51. (New) The method as claimed in claim 50, wherein the precursor of at least one structural layer comprises:

an article containing reinforcing fibers; and

a polymer matrix

52. (New) The method as claimed in claim 50, wherein the precursor of at least one structural layer is an article containing reinforcing threads and/or fibers and threads and/or fibers of polymer matrix.

53. (New) The method as claimed in claim 52, wherein the article is in the form of continuous threads, cut threads, strips, mats, of braided, woven fabrics, knitted fabrics, fleece, multiaxial materials, or nonwovens.

54. (New) The method as claimed in claim 47, wherein the assembly is carried out by thermoforming or calendering of the various elements (C1'), (C2') and

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optionally (C3'), the various elements being thermoformed or calendered

simultaneously or successively.

55. (New) The method as claimed in claim 53, wherein the thermoplastic polymer matrix of the precursor of at least one structural layer is a thermoplastic matrix and in that the temperature during thermoforming or calendering is greater than or equal to the melting point of the thermoplastic matrix.